

AMENDMENTS TO THE DRAWINGS

Replacement drawing sheets with FIGURES 4, 12, 14, 15, and 19 are attached herewith. Replacement FIGURE 4 corrects typographical errors included in boxes 132, 133, and 143. Replacement FIGURE 12 adds reference "300E." Replacement FIGURE 14 corrects typographical errors included in boxes 1210 ("exteranous") and 1220 ("the workpiece the workpiece"). Replacement FIGURE 15 corrects typographical errors included in boxes 1310 ("exteranous") and 1320 ("pexels"). Replacement FIGURE 19 corrects typographical errors included in boxes 1712, 1714 ("more ROI") and associated with 1746 ("Yes" and "No").

REMARKS

In the Office Action mailed March 5, 2007, the drawings were objected to for including multiple informalities. In response, applicant has amended FIGURES 4, 12, 14, 15, and 19, as above, to correct the noted informalities and a few additional typographical errors.

In the Office Action, the specification was objected to for including an abstract of undue length. In response, applicant submits herewith a revised abstract not exceeding 150 words in length. The specification was further objected to, for including pseudo-images such as "600-A" and "700-B" in pages 19-22, which do not correspond with the new labeling of figures, such as "FIGURES 6A" and "FIGURE 7B." In response, applicant has amended the specification to replace "600-A" through "700-D" with "FIGURE 6A" through "FIGURE 7D," respectively. Further, in page 21, line 11, the template previously mis-referenced as "700-B" has been amended to be now referenced, correctly, as "FIGURE 7A."

In the Office Action, Claims 11, 17, 21, 22, were objected to for including various informalities. In response, applicant has amended Claims 11, 21, and 22 to correct the noted informalities, and canceled Claim 17 without prejudice.

In the Office Action, Claims 1-3, 6-10, and 12-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,859,698, issued to Chau et al. (hereinafter "Chau") and U.S. Patent No. 5,481,712, issued to Silver et al. (hereinafter "Silver"). On the other hand, Claim 11 was indicated as including allowable subject matter.

While applicant greatly appreciates the Examiner's allowance of the subject matter included in Claim 11, applicant believes that the subject matter of Claim 11 is unnecessarily restrictive and does not encompass the invention that applicant is entitled to claim in the present application. In particular, applicant respectfully submits that the Examiner's rejection of Claim 3 was not supported by the cited references. Accordingly, applicant has amended Claim 1 to

generally incorporate the subject matter previously included in Claim 3 and submits Claim 1, as amended, to be allowable, as follows.

Original Claim 3 recited, "... image data corresponding to pixels in the region of interest that are not the identified extraneous feature pixels are not modified before performing the one or more operations associated with the video tool."

Original Claim 3 is to be interpreted in light of the specification, which recites at relevant portions as follows:

One aspect of various embodiments of the invention is that no filtering or other image modifications are performed on the "non-excluded" original image data in the region of the feature to be inspected.
(Page 4, lines 24-26).

In accordance with another aspect of the invention, the system performs no information altering morphological operations on the portions of the image that contain the valid image data outside the extraneous image feature. *This preserves the original workpiece information in its most complete form.* In one embodiment, the extraneous image feature locating operations do not simultaneously alter the "non-extraneous image feature" information. In one embodiment, total exclusion of a pixel or pixels is preferable to modification and inclusion.
(Page 5, lines 20-26, emphasis added.)

The Examiner asserts that Chau teaches the limitation recited in original Claim 3. However, actually, Chau teaches *against* this limitation. In particular, Chau teaches at Col. 2, lines 28-46 that:

Using automated image processing techniques, a computer based processing system is first trained using a reference sample, or database of the sample surface to be evaluated, to create an *edge enhanced reference template*. *One or more automated edge enhancement techniques, for example a Sobel edge detector, can be used to form the template.* Once an edge enhanced reference template is created *a sample image is acquired and enhanced in the same manner.* The resulting enhanced images are compared *and a difference image created* where edge enhanced scattering effects present in both the template and the enhanced sample image are essentially eliminated.

Again, applying one or more automated image processing techniques, for example GTC thresholding, morphological transformations and blob analysis, macro defect detection can be further improved. In this manner, *a final image having only macro defects, if any, is produced.*
(Emphasis added.)

Thus, it is clear that in Chau the sample image, before any other operations, is altered to enhance its edges, or the like. This is also shown in step 210 of Figure 2 of Chau. Furthermore, it is clear that the "final image" that is used for inspection operations in Chau is a *difference image* derived from the reference and sample edge-enhanced images. This is also shown in step 230 of Figure 2, which provides the image that is the basis for all further inspection operations. It may be noted that any modification of an apparent edge location due to the edge enhancement and difference operations of Chau is not important to Chau, since Chau is primarily concerned only with the qualitative identification of "macro defects" (see title).

In contrast to Chau, in original Claim 3 of the present application, "... pixels in the region of interest that are not the identified extraneous feature pixels are not modified before performing the one or more operations associated with the video tool." Thus, original Claim 3 requires that inspection operations (provided by the video tool) are performed on *unmodified* pixel data. It may be noted that prevention of modifications of an apparent edge location due to any image processing operation is important in the present application, since it is primarily concerned with determining workpiece dimensions, and particularly with determining precision edge locations, during workpiece inspection. Image processing operations that may alter pixel data and thereby alter an apparent edge location are therefore to be avoided, as indicated throughout the present application.

Therefore, applicant respectfully submits that the subject matter recited in original Claim 3 is allowable over the cited references, in particular Chau. Claim 1 has been amended to incorporate the subject matter of original Claim 3, and to further clarify that camera image data is finally analyzed by the inspection operations of the video tool, as opposed to some

"difference" image that is analyzed in the inspection operations of Chau. In addition, for further clarity, the video tool is further limited in Claim 1 to be an edge location type of video tool. Support for the amendment to Claim 1 can be found in the specification, for example, at page 3, lines 9-18, page 4, lines 11-26, and page 25, lines 3-5. For at least the reasons outlined above, applicant submits that amended Claim 1 is now in condition for allowance.

Claim 2 has been amended to recite particular features of the extraneous features corresponding to the extraneous feature pixels that are to be excluded in Claim 1. The recited particular features are distinct from the teachings of Chau.

Claim 3 has been amended to depend from amended Claim 2, and to incorporate the subject matter of original Claim 2. The original subject matter of Claim 3 has been deleted from Claim 3 and incorporated into amended Claim 1.

Claims 7-9 have been amended for improved clarity. Also, Claim 8 has been amended to overcome the Examiners rejection. In particular, the word "suspended" has been replaced by "deactivated", which is explicitly supported in the specification as follows:

The essential aspect of the widget 1520 is that it is usable to activate or deactivate an operating mode that is usable to identify and exclude extraneous image data from the various image processing or analysis operations according to this invention.

(Page 31, line 17-20, emphasis added.)

Claims 2-16 all depend from amended Claim 1. Therefore, these dependent claims are believed to be allowable for at least the same reasons why amended Claim 1 is allowable. Claim 18 has been amended, similarly to Claim 1, to incorporate the subject matter previously included in original Claim 3, and thus is believed to be allowable for the same reasons discussed above. Further, Claims 19-22 all depend from Claim 18, and have been amended for consistency with amended Claim 18, where required. Therefore these dependent claims are believed to be allowable for at least the same reasons why Claim 18 is allowable.

CONCLUSION

Based on the foregoing, applicant submits that the present application including Claims 1-16 and 18-22 are in condition for allowance. An early action allowing the present application to be issued as a patent is respectfully requested. If the Examiner should have any further issues to resolve, he is invited to telephone applicant's undersigned attorney at the number set forth below.

Respectfully submitted,

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